REMARKS

Claims 1-22 are pending. Applicants gratefully acknowledge the Examiner's indication that Claim 13 is allowed. The Examiner's reconsideration of the objection and rejections is respectfully requested in view of the following remarks.

Objection to Drawings

The drawings are objected to by the Office Action for reasons given on page 2. Applicants respectfully submit that the Applicants' name and docket number are within the one-inch margin of the page, outside the useable surface, and will not appear in the published application (35 C.F.R. §1.84(g)). Accordingly, Applicants request the withdrawal of the Objection.

Claim Rejections – 35 U.S.C. §103

Claims 1-12 and 12-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rosenbaum et. al. US Patent 4,384,329 in view of Liddy et. al. US Patent 5,873,056 for reasons stated on pages 3-13 of the Office Action. Applicants respectfully traverse the rejections. Applicants respectfully submit that the Office Action fails to establish a *prima facie* case for obviousness for Claims 1, 14, 15, 16 and 22..

Applicants respectfully submit that Rosenbaum fails to teach or suggest every feature claimed in Claims 1, 14, 15, 16 and 22. Arguments regarding this, and summarized herein, were presented in the response to Office Action dated 20 December 2003, but the current Office Action failed to address such arguments.

For example, Rosenbaum fails to teach or suggest *the value of each element* v_{ij} *of index matrix V is a function of the number of occurrences of the* i^{th} *vocabulary term in the* j^{th} *documen t* as essentially claimed in Claims 1, 14, 15, 16 and 22. At the very

minimum, as previously argued, the Rosenbaum matrix is a square binary matrix, where each element is a single bit binary number. The *index matrix V*, as essentially claimed by Claims 1, 14, 15, 16 and 22, is a rectangular matrix, where each element represents the number of occurrences of a particular word in a document, which cannot be represented by a single bit binary number. For this reason, Rosenbaum clearly fails to teach or suggest *the value of each element v_{ij} of index matrix V is a function of the number of occurrences of the i^{th} vocabulary term in the j^{th} documen t* as essentially claimed in Claims 1, 14, 15, 16 and 22.

As another example, applicants respectfully submit that Rosenbaum fails to teach or suggest *factoring out non-negative matrix factors T and D such that $V \approx TD$, wherein T is an n x r term matrix, D is an r x m document matrix, and $r<nm/(n+1)$* as essentially claimed in Claims 1, 14, 15, 16 and 22. At the very minimum, as previously argued, the run-length encoding used to reduce the size of the Rosenbaum matrix does so without loosing any data. The non-negative matrix factorization that produces the matrix T and D, as essentially claimed in Claims 1, 14, 15, 16 and 22, is fundamentally different from run-length encoding, in that it is a lossy process as indicated by "*$V \approx TD$*", as esentially claimed Claims 1, 14, 15, 16 and 22. Thus, Rosenbaum fails to teach or suggest *factoring out non-negative matrix factors T and D such that $V \approx TD$, wherein T is an n x r term matrix, D is an r x m document matrix, and $r<nm/(n+1)$* as essentially claimed in Claims 1, 14, 15, 16 and 22.

Again, the current Office Action has not presented any reasons as to why the Applicant's previously presented arguments regarding the above claimed features, are

incorrect. Therefore, Rosenbaum fails to teach or suggest at least the claimed elements discussed, regarding Claims 1, 14, 15, 16 and 22.

Further still, Applicants agree with the Office Action that Rosenbaum does not teach, at the very least, a *non-negative matrix* as essentially claimed in independent Claims 1, 14, 15, 16 and 22.

However, at the very minimum Liddy does not cure the deficiencies of Rosenbaum. For example, Liddy teaches (col. 8, lines 23-24) a matrix of positive coefficients. Even assuming arguendo that this is similar to the *non-negative matrix* as essentially claimed by Claims 1, 14, 15, 16 and 22, Liddy fails to teach *factoring out non-negative matrix factors T and D such that* $V \approx TD$ as essentially claimed by Claims 1, 14, 15, 16 and 22.

Therefore, Rosenbaum in view of Liddy fails to render Claims 1, 14, 15, 16 and 22 *prima facie* obvious for at least the reasons stated above.

Moreover, in further regard to independent Claims 1, 14, 15, 16 and 22, applicants respectfully submit that at the very minimum there is no motivation to combine the Rosenbaum and Liddy references as stated in the Office Action. By combining Rosenbaum and Liddy, the Rosenbaum system's fundamental principle of operation is changed, as discussed below, whereby a case for *prima facie* obviousness can not been established against Claims 1, 14, 15 16 and 22. (See MPEP 2143.02)

For example, Rosenbaum, is a system for finding the synonym or antonym of a given search word (Rosenbaum col. 2, lines 1-25). Liddy is a system for the automatic classification and retrieval of documents by their general subject content with statistically guided word sense disambiguation (Liddy col. 1, lines 8-11). Retrieving a word that is

the synonym of another word is obviously different from retrieving documents by their general subject content, at least by virtue of the differences between individual words and documents. Also as a word either is or is not a synonym, the Rosenbaum system does not use or need statistically guided word sense disambiguation. At the very minimum, getting the Rosenbaum system to search for documents, instead of words would require a change in the principal of operation of Rosenbaum. Further still, adding the functionality of statistically guided word sense disambiguation, would require a change in the principal of operation of Rosenbaum, as well.

As another example, the original Rosenbaum system (Rosenbaum col. 2, lines 1-25) was designed to search, through a list of individual words using a run-length encoding reduced **binary matrix**, and to return the synonyms (or antonyms) of any given search word. The resultant words **either are or are not** synonyms (or antonyms), **there is no ambiguity**, and hence a **binary matrix, whose coefficients are either 0 or 1,** is used. The **Liddy matrix** (Liddy col. 8, lines 21-24) referenced by the Office Action on page 4 is a **matrix of positive correlation coefficients between 0 and 1** that represent the probability that a particular SFC will co-occur with every other SFC. The Office Action on page 4 suggests that the Rosenbaum **binary matrix** be replaced by the **Liddy matrix**; however, even with the assumption that an SFC is a word in the Rosenbaum sense, the Rosenbaum system would have to **change its principal of operation** to deal with the **ambiguity presented by the probability coefficients** that can range from a **value between 0 and 1**.

Therefore, as the modification proposed by the Office Action changes the Rosenbaum reference's principal of operation, for at least the reasons discussed above, a

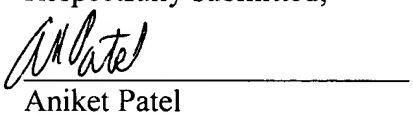
case for *prima facie* obviousness has not been established against Claims 1, 14, 15 16 and 22. (See MPEP 2143.02)

With regard to dependent Claims 2-11 and 17-22 that depend from Claims 1 and 16 respectively, the Office Action fails to establish a *prima facie* case for obviousness for at lest the reasons given for independent Claims 1 and 16.

Accordingly, Applicants respectfully request the withdrawal of the Office Action's rejections.

All issues raised by the Examiner having been addressed, reconsideration of the rejections and an early and favorable allowance of this case is earnestly solicited.

Respectfully submitted,



Aniket Patel
Reg. No. 55,525
Agent for Applicant(s)

F. Chau & Associates, LLC
130 Woodbury Road
Woodbury, NY 11797
TEL.: (516) 692-8888
FAX: (516) 692-8889